

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF GEORGIA**

RESOLUTE FOREST PRODUCTS, INC., *et al.*,

Plaintiffs,

v.

GREENPEACE INTERNATIONAL, *et al.*,

Defendants.

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NO. CV 116-071

**DECLARATION OF PETER REICH IN SUPPORT OF PLAINTIFFS' RESPONSE TO
DEFENDANTS' MOTIONS TO STRIKE, DISMISS, AND TRANSFER VENUE**

I, **PETER REICH**, hereby certify as follows:

I have been retained by Plaintiffs to offer my opinion regarding the ecology of Canada's boreal forest, generally, and more specifically, with respect to Defendants' statements concerning the ecological impacts of Resolute's harvesting operations within the Canadian boreal zone. I submit this Declaration in support of Plaintiffs' Response To Defendants' Motions To Strike, Dismiss, And Transfer Venue.

I am over the age of 21, and I am competent to provide this Declaration. I make this Declaration based upon my own personal knowledge and for all purposes allowed by law.

Qualifications

1. I am a Regents Professor (highest rank at the University) and the F.B. Hubachek, Sr. Professor at the University of Minnesota's Department of Forest Resources. My teaching and research focuses on ecology, global change, and the sustainability of managed and unmanaged terrestrial ecosystems. My work focuses regionally on North America's forests and grasslands and on global terrestrial ecosystems. This work includes long-term experimental field studies of

climate change effects on forests and grasslands, long-term observational studies using field and inventory data, and the development of complex global carbon cycling models.

2. I have written over 500 published, peer-reviewed articles for international scientific journals or books, including dozens in leading journals such as *Science*, *Nature*, and the *Proceedings of the National Academy of Sciences*, and have been engaged in research on five continents, in boreal, tropical, and temperate ecosystems. My papers have been cited in peer-reviewed scientific literature during the past 20 years more than any other forest scientist in the world. Additionally, I received the Nobel Prize equivalent in forest ecology: the BBVA Foundation Frontiers of Knowledge Award in Ecology and Conservation Biology (2010). Moreover, I have been selected as a member of the American Academy of Arts and Sciences (2011). Furthermore, I have also served on leading international journals' editorial boards, and on advisory and review panels for the National Science Foundation, National Academy of Sciences, the U.S. Department of Agriculture, the U.S. Forest Service, NASA, and the EPA.

3. Most importantly, I have considerable experience researching the boreal forest's ecology, including its fire ecology, the impacts of harvesting on forest productivity and on biodiversity, and on the role of climate change, deer, insects, fire, and windstorms in shaping forests in the past, present, and future. I have been involved in research examining boreal forest physiology, ecology, and growth in Canada, Scandinavia, Russia, although most of my work has focused on northern Minnesota. This work has been presented in dozens of scientific peer-reviewed papers, including in leading journals such as *Nature* and *Science*.

4. Attached hereto as Exhibit A is a true and correct copy of my curriculum vitae.

Summary of Opinions

5. Defendants claim that Resolute is a "Forest Destroyer." However, the boreal is a vast landscape covering close to 2.5 billion acres globally, of which approximately 785 million

acres are in Canada. Total annual harvest in the boreal is about two million acres or roughly 0.2% of the boreal forest in Canada (Ex. B, State of Canada's Forests 2004-2005). Based on information provided by Resolute, I understand that Resolute is responsible for 8.5% of that 0.2% or 0.017% of the boreal forest in Canada annually. In the boreal forest, far more trees are impacted by natural causes (fires, insects, disease, and wind) than by harvesting. In fact, the nominal 0.02% of the boreal forest "destroyed" annually is due to urban and industrial development: not Resolute's – or any other forest product company's – harvesting operations.

6. Resolute's harvesting operations do not aggravate climate change. Reaching this conclusion requires distinguishing between timber harvest and deforestation. Timber harvest removes trees, and results in new, replacement trees: forest remains forest. In deforestation, trees are removed or burned, and no or very few trees remain, resulting in large movements of carbon dioxide into the atmosphere, further accelerating climate change. Although significant deforestation does contribute to climate change, this effect is almost entirely in the tropics, and is notably not occurring in the boreal.

7. Additionally, Resolute's harvesting has not significantly impacted woodland caribou populations. Scientific literature demonstrates that caribou are most affected in western Canada, especially in Alberta and British Columbia, an area far from Resolute's operations in Quebec and Ontario. Based on information provided by Resolute, I understand that, in both Quebec and Ontario, about 75% of the woodland caribou range is located north of the managed forest, areas where the forest product industry has no access and is not allowed.

8. Moreover, the Quebec and Ontario provincial governments are responsible for caribou management. In the areas where Resolute is permitted to harvest, it does so under the

strict guidelines and regulations of the Quebec and Ontario provincial governments. Canadian forests are among the most strictly regulated in the world.

9. Defendants' accusations regarding woodland caribou are based on disturbance levels, which are a rough but useful guide to potential management impacts. However, estimates of caribou populations, mortality and recruitment are highly uncertain, as is the relationship of population to disturbance. My review of Resolute's harvesting operations reveals that Resolute's activity, in the aggregate, is below the threshold of likely perceptible adverse impact on specific woodland caribou populations' sustainability. Resolute offers no threat to the species continued viability. Moreover, it is impossible to disentangle impacts on caribou of Resolute from other forestry operations, from wildfire, climate change, road network expansion, and hunting. However, the level of harvest disturbance by Resolute in the regions of concern strongly suggest Resolute has not damaged caribou. Evidence to the contrary is highly speculative and uncertain; thus, defendants exaggerate the impact of Resolute's forestry operations on caribou sustainability.

Resolute Has Not Destroyed the Boreal Forest In Any Sense

10. Resolute has not destroyed, and is not destroying, the boreal forest. Because almost all harvested stands grow back to boreal forest, Defendants' claims about Resolute's forest "destruction" cannot be true.

11. My review of Plaintiffs' Complaint and Appendices reveal that Defendants made many statements that charge Resolute with "destroying" Canada's boreal forest, either with a blanket statement without spatial context or specifying a specific region such as the Montagnes Blanches region of northern Quebec.

12. Of course, Resolute is engaged in forestry activities in many parts of the Canadian boreal forest. Based on information provided by Resolute, I understand that Resolute has harvested thousands of acres of Quebec boreal forest since 2008. However, virtually every one of

those acres remains “boreal forest” to this day, so the claim of “destruction” is false. Defendants’ claim that Resolute’s activities in the Canadian boreal forests “destroy” those forests is intellectually similar to a claim that Iowa farmers destroy their farms each year when they harvest the corn and soybeans from their fields. Both farming and forestry operations impact the land, sometimes in adverse ways, but “impacting” is wholly different from “destroying.” In fact, the only places in which vast swathes of forest have been *destroyed* are places where the landscape has literally been turned into cities (*e.g.*, Atlanta,) or converted to row-crop agriculture or pastures (*e.g.*, Ohio corn fields).

13. As explained below, the boreal forests’ unique characteristics lead to important contrasts in how timber harvest impacts the state of the forests. Understanding the natural conditions of different forests is key to understanding the differing response of boreal forests. As explained below, it cannot be said that Resolute has even figuratively destroyed the boreal forest. Under each of the three major ecological considerations: (i) the age structure of the forest, (ii) the species diversity and mix of the forest, and (iii) the capacity to grow, Resolute has neither so compromised nor changed the boreal forest that the concept of “destruction” could be said to apply.

14. *Age Structure:* Most global forests are recovering from a prior disturbance (such as wildfire, harvesting, wind, ice, insects, or disease) that in a relatively short period impacted many of the individual trees. As a result, forest landscapes or regions of the world are all made up of forest stands of differing ages due to different times since disturbance; this has been true prior to major human interference.

15. Natural disturbances are much more frequent in boreal forests than in other forests.¹ Boreal forests experience stand-clearing wildfires and/or insect pest infestations that kill all or

¹ Because major stand clearing disturbances like wildfire are rare in moist tropical and temperate forests, periods between stand-clearing disturbance are long enough that many individual trees die of old age related processes

most of the trees every 50 to 250 years or so (depending on the type of forest, the location within the region and landscape, and other factors). Thus, the boreal forest landscape is naturally made up of forest tracts much younger on average than other forests: an expanse of native natural boreal forest in Quebec might average 100 years since major disturbance and contain forests of every age between 0 and 250 years old.

16. Logging in boreal forest at a rate of 0.5% of stands every year would result in a forest with a mean stand age of ~100 years (ignoring other disturbances), similar to the natural mean stand age. The younger age structure of a managed landscape where some (rather than no) logging occurs is a *smaller deviation from the historical pattern* in a boreal forest zone than other forests. Because boreal forests are naturally younger on average than most other forests (without human interference), the impact of timber harvest on the age structure of the boreal forest is much smaller than in other forests of the world.

17. Data from a Quebec-based study illustrates how this phenomenon has played out in an area similar to those harvested by Resolute in Quebec. A detailed study of 16,000 km² region of western Quebec with considerable harvest activity found that under the natural fire regime, young stands (0 to 40 years old) rarely comprised more than 30–38% of the landscape, whereas they currently cover about 47% (Ex. C, Cyr et al. 2009). In essence, harvesting there has resulted in fewer forests older than 100 years and an increase in young forests. But the range of stand ages remains the same (from 0 to ~200-250 years old). The forest age structure has been altered by harvesting in that region. In neither case has the population been “destroyed.”

rather than disturbance per se, or small disturbances (like a single tree blowdown) kill a small fraction of trees in a stand. Such forests will have trees of many ages; referred to as “uneven-aged.” Forests where most of the dominant trees began life following the same disturbance (and are thus of similar age) are called “even-aged.” Where disturbance is rare, as in rainforests, the mean age of the forest as a whole as measured as time since major disturbance might be 500-1500 years or more and the mean age of the large dominant trees in these forests might be 150 to 300 years old or older.

18. It is also worth pointing out the extent of Resolute's harvest operations in the Montagnes Blanche and Broadback Valley regions. I have assumed for purposes of this analysis that Resolute harvested in the "Broadback Valley" and "Montagne Blanches" regions as defined in the Greenpeace Reports, maps which are annexed hereto as Exhibits D-1. I understand that Resolute contends that it has not harvested in the official Montagnes Blanches (*see* Ex. D-2, official Quebec map of Montagnes Blanches) and that Resolute contests Greenpeace's contention that it operated in any impermissible or restricted areas, such as the Broadback Valley post-moratorium.² In any event, my analysis assumes Greenpeace's boundary claims regarding the Montagnes Blanches to be true (although disputed by Resolute). Based on information provided by Resolute, between 2008 and 2015, Resolute harvested wood in 1.53% of these two regions combined (Broadback Valley and Montagnes Blanches). This is a considerably lower extent of harvest than in the region studied by Cyr, where forestry modestly influenced forest age structure (Ex. C). Thus, not only did Resolute not destroy any of the Montagnes Blanches or Broadback Valley, but the vast majority of the forest was untouched.

19. *Species Diversity and Forest Mix*: The trees and other species in boreal forests are adapted to, and resilient in the face of, disturbance, as they have evolved with frequent wildfire and insect disturbances. In fact, boreal forests almost invariably regenerate to forest whether cleared by wildfire or insects (or harvesting). Boreal forests are resilient to and regenerate following disturbance rather than being destroyed by disturbance, whether natural or human-induced.

20. Thus, because species (plants, animals, microbes) of boreal forests are adapted to severe and frequent natural disturbance, they are generally more resilient to harvesting than is the

² *See* Ex. D-3 for a map contrasting Greenpeace's boundaries of the "Montagne Blanche" (Ex. D-1) with that of the official Quebec government (Ex. D-2).

case for most other major forests of the world. Most boreal species can persist in a landscape with or without disturbance (whether natural or human-caused). As a result, measures of species diversity usually show very modest if any response to harvesting (meaning similar numbers of species are found in areas regrown from harvesting as from wildfire).

21. It is true that the particular mix of species on a given landscape may shift with harvesting. The mix of these species (and of the ground layer plants and the animals) is altered by harvesting, but the vast majority of species still thrive somewhere in the landscape as long as some areas recently burned or harvested, and some areas without recent disturbance, still occur in substantial extent.³

22. *Productivity Impact:* I am not aware of any objective evidence indicating that a landscape with a historical mix of disturbances is any different in productivity than one with only natural disturbances. Measures of tree growth and productivity do not indicate any loss of productivity following harvesting. Both fire and harvesting can adversely affect the capacity of the soil to support growth (fire and harvesting can in some instances be argued to also improve soil), but the degree depends on the severity of fire and/or the care taken during harvesting to minimize soil disturbance.

Resolute Does Not Negatively Contribute To Climate Change

23. Defendants claim that Resolute aggravates climate change. This statement shows a fundamental disregard for scientific reality.

24. A key distinction needs to be made between timber harvest and deforestation. Timber harvest removes trees, and results in new, replacement trees: forest remains forest. In

³ The mix of species has varied just as much in the past at only slightly longer timer intervals due to natural variation in fire frequency and climate. Moreover, the boreal forest is likely to be altered as much, and likely much more, by climate change (through warming and increases in fire frequency).

deforestation, trees are removed or burned, and no or very few trees remain. This distinction is critical to understanding whether forested regions are continuing to slow climate change or not. Canada's managed boreal forests (where harvesting occurs) actually slow climate change, albeit by a very small percent (offsetting roughly 0.3% of global carbon emissions annually). All of Canada's boreal harvested by Resolute remains forested. In contrast, the deforestation of tropical forests contributes to roughly 20% of the global carbon emissions driving climate change (with the other 80% due to fossil fuel burning and cement production). These facts are wholly inconsistent with the assertion that Resolute is putting the climate at risk.

25. The atmospheric concentrations of CO₂ are increasing because of the release of CO₂ from fossil fuel burning (and secondarily to burning or decomposition of trees during tropical deforestation); global warming is due to these increasing atmospheric CO₂ concentrations. Forests can slow this increase by absorbing more CO₂ than they return to the atmosphere, or speed it up by returning more CO₂ than they absorb. Harvesting operations alter the net exchange of CO₂ between land and atmosphere in ways that can either further speed up or slow down climate change, depending on the condition of the forest post-harvest and the fate of wood products moved off of the forests. As explained in detail below, the zone of Canadian boreal forest where harvesting occurs is currently slowing climate change, not accelerating it.

26. Imagine a 100 x 100 mile area of boreal forest. In any given year or decade, trees will grow new biomass, almost half the dry weight of which is carbon extracted out of the atmosphere through photosynthesis. But, during the same year or decade, CO₂ is returned to the atmosphere by the respiration of live trees and of the microbes decomposing dead trees (think of this as trees and microbes "breathing out" CO₂); and also by fire that converts the carbon in live and dead biomass into CO₂ gas. In a world without people, the new carbon taken up by trees and

built into new biomass would roughly equal the amount of carbon returned to the atmosphere through respiration of live trees, decomposition of dead trees, and fires. In other words, although the total amount of carbon in one acre likely would increase or decrease over time, the total amount on the 100 mile x 100 mile area would be relatively unchanged.

27. The large majority of boreal stands grow following earlier disturbances, primarily wildfire and harvesting. Wildfire can literally burn much of the forest floor and soil, reducing future productivity. When harvesting is carefully done, soil is negligibly impacted; when poorly done, harvesting degrades the soil. There is no scientific evidence that tree growth in logged areas is different than in areas recovering from wildfire. Thus, boreal forests grow new trees and new wood, at roughly the same rate whether previously disturbed by wildfire or by harvesting.

28. If 10% of our imaginary 100 mile x 100 mile landscape were harvested in a decade and all of those logs immediately burned (returning CO₂ to the atmosphere), that action would speed up climate change. On the other hand, if all of those logs were converted into fine furniture to be used for a century, then the harvesting would likely slow climate change. The point of this illustration is that knowing whether harvesting accelerates or slows climate change requires knowing one thing: at any given time, is the total amount of carbon in the forest and harvested from the forest (and not yet returned to the atmosphere) greater or smaller than it was at an earlier time? The answer to that question involves two component values: the total amount of carbon in the forest and the fate of the carbon removed from the forest.

29. Leading Canadian scientists recently evaluated the impact on the global carbon cycle of Canada's boreal forest (Ex. E, Kurz et al. 2013).⁴ Their detailed examination of the rate of movement of carbon between the atmosphere and the managed Canadian boreal forest shows a

⁴ Indeed, one of these Canadian scientists – Werner Kurz – was recognized by the joint award of the 2007 Nobel Peace Prize, alongside Al Gore, for his research regarding climate change.

greater accumulation of carbon today (with harvesting activity occurring periodically) than in the past (Ex. E). Natural disturbances that kill trees cause relatively rapid movement of carbon to the atmosphere. In contrast, a considerable proportion of the carbon removed from the forest and turned into paper, lumber, and other products, remains stored on land annually. A large fraction (57%) of the carbon harvested since 1990 remained stored in wood products and solid waste disposal sites in Canada and abroad in 2013 (Ex. E). Additionally, by shifting the mix of forests to a younger average age, forestry likely slightly increases the annual growth of those forests.

30. These scientists concluded that the managed portion (roughly half) of the Canadian boreal forest was removing more carbon from the atmosphere than it was returning (i) because some of the harvested wood products remained on land (did not decompose) and provided carbon storage; and (ii) because total forest biomass increased over time, despite harvesting (Ex. E).

31. The area of Canadian boreal forests is approximately four times the size of Texas. Managed boreal forests (roughly the southern portion) in Canada make up 54%; or 145 Mha (1.45 million km²). These forests contains 28 Pg carbon (a Pg is equal to 1 trillion kilograms) in trees and in the soil (Ex. E). Kurz and colleagues calculated a net increase from 1990 to 2008 in managed Canadian boreal forests of 532 Tg (0.53 Pg), equal to 28 Tg (0.028 Pg) carbon per year (Ex. E). This is five times greater the annual rate of carbon removed from the atmosphere than the average for the 6,000 years prior to 1990, and likely 10 to 25 times greater than the annual net change in carbon for that zone in the past 1,000 years. How has the managed forest taken more carbon out of the atmosphere annually from 1990-2008 than prior to active forestry? The answer is two-fold: regenerating forests fully replaced the carbon removed in harvest and added an additional 11 Tg/year. Additionally, an even greater amount of carbon in forest products (17 Tg) remained intact or undecomposed on land. Thus, the managed forests removed 28 Tg carbon from

the atmosphere annually. Through regenerating harvested areas, forest product companies (such as Resolute) have actually helped to slow the effects of climate change.

32. The evaluation of Canadian boreal forests concluded that there is no evidence that forestry management has accelerated the flow of carbon back into the atmosphere, and instead those lands act to cool the planet, slowing climate change (Ex. E). Additionally, they concluded that climate change itself is by far the biggest threat to further climate change that might be induced by changes in the boreal forest (because a warming climate accelerates decomposition of dead biomass in the forest and is likely to double the forest area burned by 2100, both of which result in transfer of carbon from ecosystems to the atmosphere) (Ex. F, Bergeron et al. 2010).

33. However, *even if the science was completely wrong*, and Canada's managed boreal forest was moving 0.028 Pg carbon to the atmosphere annually, its contribution to climate change would be very small: $\approx 1\%$ of that due to tropical forest deforestation and approximately one-fifth of 1% of total CO₂ emissions driving climate change (*i.e.* 1/500). Moreover, given that Resolute is responsible for harvesting 0.0017% of the Canadian boreal forest annually, it would contribute to less than 0.02% (2/10,000) of climate change. At that rate, in 100 years, Resolute would cause global temperatures to rise by less than 0.001 °F; a negligible amount. But again, that would only be the case if the established science were completely *wrong*; because science's best estimate is that Canada's boreal forests where Resolute harvests have been very slightly helping to cool the planet by 0.001 to 0.004 °F per decade. Thus, there is no credible way to fashion an argument that Resolute is a threat of any kind to global climate.

Evaluation of Scientific Literature Cited By Defendants Regarding Climate Change

34. In addition to laying out a comprehensive examination of the scientific understanding above, I also examined the scientific basis for the claims made by Greenpeace

regarding climate change on page 19 in their Motion to Strike (Doc. 60). As shown below, they fail to properly use scientific evidence in support of their assertions.

35. It is true that boreal forests house a great amount of carbon. But, since Greenpeace has not alleged that Resolute has impacted a large fraction of the entire global boreal forest, but rather is focused on actions in a specific area in north central Quebec, the size of this *entire* global forest is irrelevant.

36. Defendants argue that scientific literature supports the conclusion that Resolute’s “logging efforts in one of the ‘largest intact forests in Canada,’ can ‘mea[n] bad news for the climate.’” This statement is inaccurate and misleading: a proper analysis of the effect of Resolute’s harvesting operations on the climate requires measuring the amount of carbon emitted compared to the amount of carbon absorbed. As explained, Resolute’s net carbon impact is insignificant as is its impact on the climate.

37. Defendants further claim that “forests continue to sequester carbon as they age, so older forests store more carbon.” This statement conflates the amount of carbon sitting on a given tract of land with whether the trees and microbes living on that land remove more carbon from the atmosphere than they return per year. As above, the latter calculation is the only relevant measure of how a forest impacts on the amount of carbon in the atmosphere, and thus on climate.

38. Defendants also state that “[s]cientific studies” have “concluded that natural forests store more carbon than forests managed for timber production due to their older average age.” They rely on a 1998 computer modeling study of hypothetical forest landscapes with limited focus on the region in question. Defendants are “cherry-picking” and distorting results from a study that is weakly related and largely irrelevant to the issue at hand, rather than examining the state-of-the-art science of today. Defendants make a key assertion – that harvesting operations convert boreal

forests from climate cooling to climate warming – based on a computer modeling study that is not sufficient evidence for such a claim. Defendants should have referred to a more recent (2013) and more comprehensive paper led by the same scientist, which relied on observed data, rather than a computer simulation to evaluate the climate impacts of Canada’s managed boreal forest. That study reports that the managed boreal forest is having a slight *cooling* effect on global climate, helping rather than further warming the planet (Doc. 60-1, Koonce Declaration).

39. Finally, Defendants state that “[f]orest degradation unlocks the carbon stored in the soil in a variety of ways that scientists are still exploring. When boreal forest vegetation or soils are disturbed, carbon is released, accelerating climate change.” Neither of the underlying references used to support that statement are relevant to whether disturbance of boreal forests releases carbon; one involves a specific tropical forest in Malaysia and the other is about how deforestation in the tropics accelerates climate change (*Id.*).

40. Detailed examination of the supposed sources of scientific evidence bolstering Defendants’ claims clearly show either intent to deceive, shoddy science, or both. Thus, Defendant Moas’s overall conclusion that Resolute “put[s] our global climate at risk” has no basis in fact.

Resolute Does Not Jeopardize The Woodland Caribou In Northern Quebec.

41. My review of the Complaint and Appendix reveals that Defendants made many statements that charge Resolute with causing declines in caribou populations.

42. Based on information provided by Resolute, between April 2008 and 2015, Resolute harvested 0.01% and 2.97% of two regions in Quebec identified by Defendants as “endangered forest areas” (Greenpeace labels these regions as the “Broadback” and the “Montagnes Blanches”) (Ex. D-1). Based on information provided by Resolute, between 2008 and 2015, Resolute’s total harvest was 1.53% of the combined area of the “Broadback” plus the “Montagnes Blanches.” I have further learned from Resolute that the total percentage of this

combined area harvested in 2008-2015 by all forestry operations (not just Resolute) was 3.03%, about 0.43% of those regions per year.

43. Defendants' accusations regarding woodland caribou are based on disturbance levels, which are a rough but useful guide to potential management impacts. Although the set of conditions that lead to poor caribou regeneration are complex, a consensus among Canadian scientists is that the greater the landscape coverage of recent landscape disturbance, the poorer the success of caribou recruitment. Factors leading to high risk for caribou populations have occurred in certain parts of Canada (due to high disturbance rates from wildfire, timber harvest operations, oil and gas development, road building in general and other). As of 2011 populations were unlikely or very unlikely to be self-sustaining throughout all areas of caribou range in Alberta and Saskatchewan, and were considered likely sustaining for most of the range in Quebec and Ontario (including all of the broad range within which Resolute's operations have taken place) (Ex. G, Environment Canada 2011).

44. The most current assumption (yet still uncertain) suggests that caribou herds are self-sustaining when the percent of land disturbed is 35% or less (Ex. G) and the Canadian government suggests this level be used in conservation planning (Ex. H, Environment Canada 2016). A report of non-peer reviewed research focused on northern Quebec suggests caribou populations there may be at more risk than the 2011 Canadian government report suggests (Ex. I, Rudolph et al. 2012). Differences in delineation of "populations" and of risk levels for a given level of disturbance among researchers exist because data in general are sparse, so definitive knowledge is lacking. Based on information provided to me by Resolute, Resolute's harvesting within regions that Defendants identify as critical for caribou populations range from 0.01% for the Broadback to 2.97% for the Montagnes Blanches for the 2008-2015 period. All forest product

companies combined harvested these areas at range of 1.08% for the Broadback to 4.63% for the Montagnes Blanches for the 2008-2015 period. Even accepting Defendants' claims regarding the sustainability threshold, Resolute (and other forest product companies) have not threatened the sustainability of caribou populations in these relevant regions.

45. Woodland caribou live in boreal forests, feeding primarily on lichen (Ex. J, Thompson et al. 2014). Lichen are abundant (covering $\approx 43\%$ of the ground) in "open lichen woodlands," where trees are fewer, smaller, and more scattered than in forest – and where harvesting rarely takes place (Ex. K, Hins et al. 2009). Generally, open lichen woodlands do not carry enough volume per acre to support harvesting. Resolute has not harvested "open lichen woodland" areas in the three zones in question. On average, denser forests are 4% covered by lichen, and are less important food sources for caribou (Ex. K). Harvesting does not negatively impact the potential food sources of caribou even in regenerated forests. In fact, recent caribou surveys show that caribou, like moose and other ungulates, feed in recently harvested areas. Hence, Resolute has not threatened caribou by altering their food supply in the zones in question, especially considering the small fraction of the areas where harvest operations took place.

46. Caribou use almost all available habitat. For example, caribou several hundred kilometers south and east of the Montagnes Blanches region used young forests (0-50 years old) which made up 29% of the landscape for 30% of the time; they used forests 50-120 years old 42% of the time (they were 42% of the landscape) (Ex. K). Lichen availability is low in all areas of potentially productive forests (2-6% lichen coverage for forests between 5 and 120 years old). Caribou use of peatlands, water, open lichen woodlands and roads was also within 1% of their availability on the landscape (Ex. K). Harvesting by Resolute has very modestly altered the

mixtures of forest stand ages, thus is very unlikely to have threatened caribou by eliminating vital types of habitat.

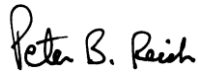
47. It is clear that the question of impact on caribou sustainability is directly linked to the percent of landscape disturbed, and indirectly related to specific changes in habitat and food supply. Given the low fraction of the Greenpeace-identified “Broadback” and “Montagnes Blanches” regions actually harvested by Resolute (1.53% harvested between 2008 and 2015) compared to the <35% level of disturbance Canadian experts consider necessary to sustain populations (and the negligible impact of harvest on the mix of habitats or food supply within habitats), Greenpeace’s claims of a “caribou death spiral” and “extinction” due to Resolute are gross exaggerations of any possible impact Resolute may have had in these regions.

Conclusion

48. In conclusion, Resolute has neither destroyed the forest, nor aggravated climate change. Resolute has also not harmed the woodland caribou in any detectable fashion. Indeed, Resolute has only harvested a small percentage of the 0.5% of the boreal that is harvested annually, all of which was regenerated and not “destroyed.” Deforestation is not a threat to Canada’s boreal forest (by contrast, it poses a pronounced threat in tropical Asia, Africa, South America and elsewhere). Similarly, Resolute has not contributed to global warming. Managed forests in the southern boreal zone are actually stanching global warming to some extent. Finally, there is no evidence that boreal’s woodland caribou populations are significantly harmed by Resolute’s harvesting in areas of concern identified by the Defendants.

49. I declare, certify, verify and state under penalty of perjury that the foregoing is true and correct.

This 22nd day of November, 2016.



Peter B. Reich, Ph.D.

CERTIFICATE OF SERVICE

This is to certify that I have this day electronically filed the foregoing Declaration of Peter Reich in Support of Plaintiffs' Response to Defendants' Motions to Strike, Dismiss, and Transfer Venue with the Clerk of Court using the CM/ECF system and served upon counsel of record by electronic filing, as follows:

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This 22nd day of November, 2016.

/s/ Lauren Tabaksblat
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